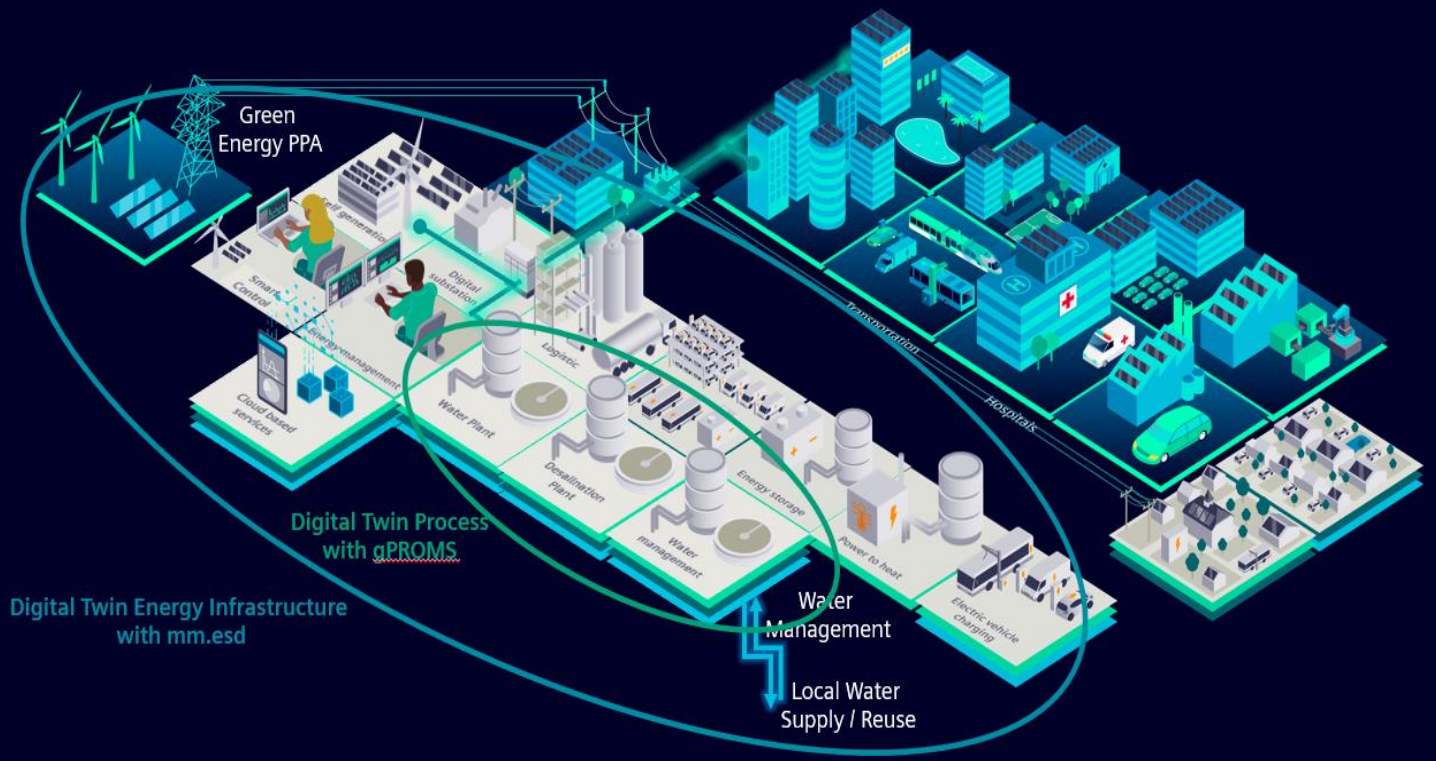
Technology selection – mm.esd to identify the best combination of all technologies available today or expected to become available in the future



- The Siemens technology map **contains available technologies** for multi-modal **energy and media supply** (e.g., electricity, steam, cooling, compressed air, mobility)
- **Innovative technologies** not commercially available today and **sector specific technologies** can be modeled
- The optimizer chooses the **cost-optimal combination** of technologies to **fulfill the given targets**
- In case of **brownfield analyses**, the **existing technology cluster** is the **starting point** and a **timeline with cost-optimal points** for investment in **new technologies** is calculated
- With this roadmap towards the target, an **overall consistent plan** for target achievement makes sure that **stranded assets are avoided** and that the first investments fit to the overall investment plan

Please follow this link:

mm.esd

multi modal energy System design

SIEMENS

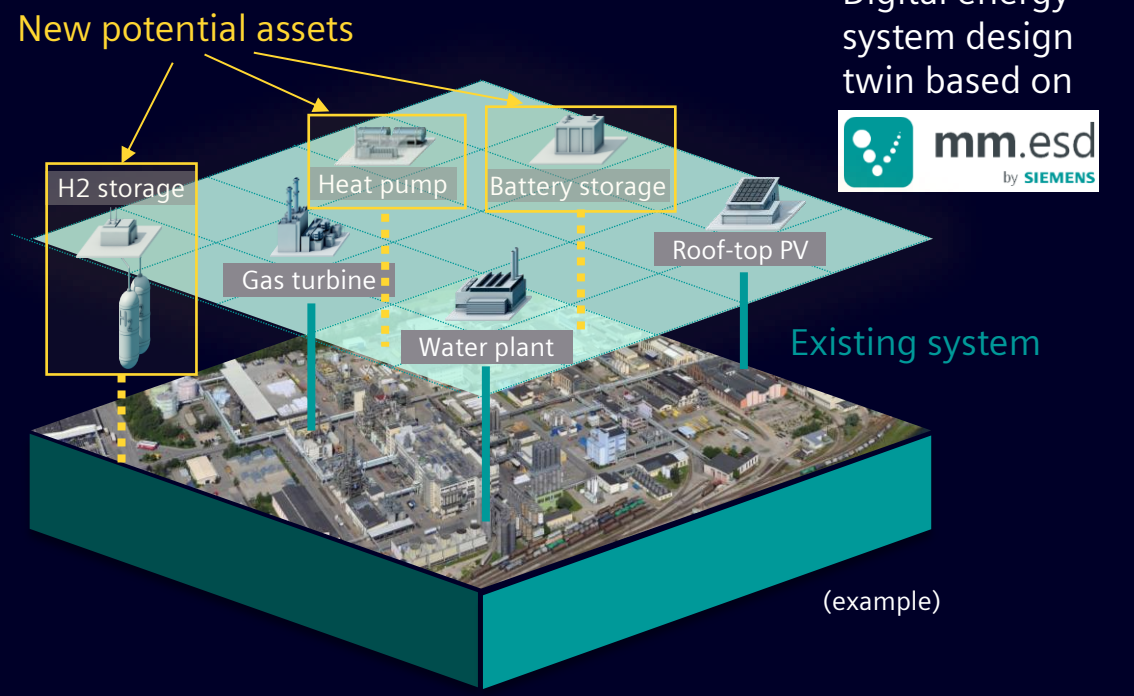
Decarbonization Roadmap with Siemens Technology prototype expert tool »multi-modal energy system design (mm.esd)«

What's needed? (input data)

- Customer objectives (motivation for change, threads)
- Demand profiles
- Economic boundary conditions
- Existing asset information if any

Key features of mm.esd

- **Flexible modeling** of multi-modal energy systems
- **Diverse regulatory** and economic boundary conditions
- **Multi-year optimization framework**
- **Security of supply**
- Asset target cost identification
- **Strategic planning**
- [...]



Digital energy system design twin based on mm.esd by SIEMENS

mm.esd identifies the optimal setup of onsite energy systems holistically based on a digital energy system design twin (selection, sizing and operation of energy assets)

What's the output?

- Optimal system setup
- Economic, ecological analysis with investment plan
- Energy flow analysis (Sankey charts) and cash flow
- [...]

Key impact of mm.esd

- **Sound investment decisions** w/ no more stranded invests
- Identification of no-regret moves
- Lowest total expenditures
- **Low-cost decarbonization measures**
- [...]

References: SAG Amberg & Erl F80 (CNP); SHARC Harbor Bremerhaven; Automotive etc. in consulting project or as SaaS

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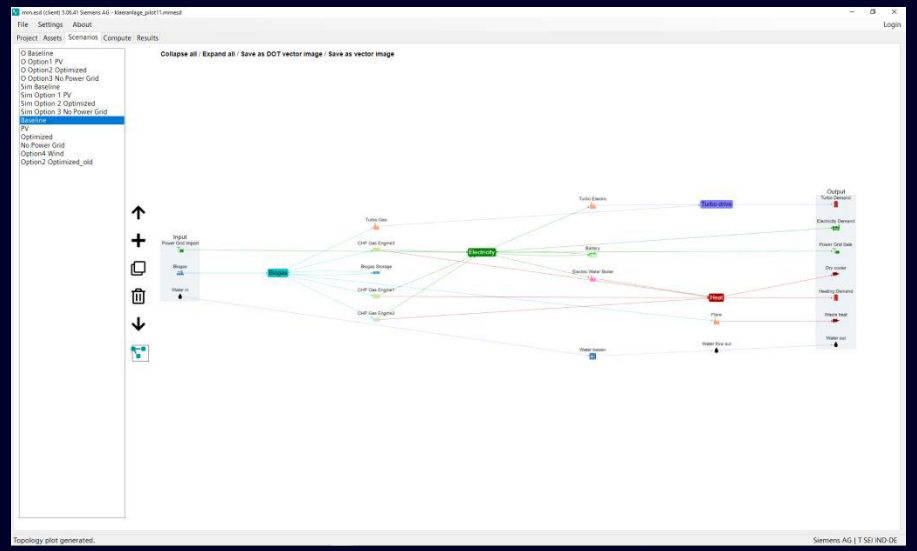
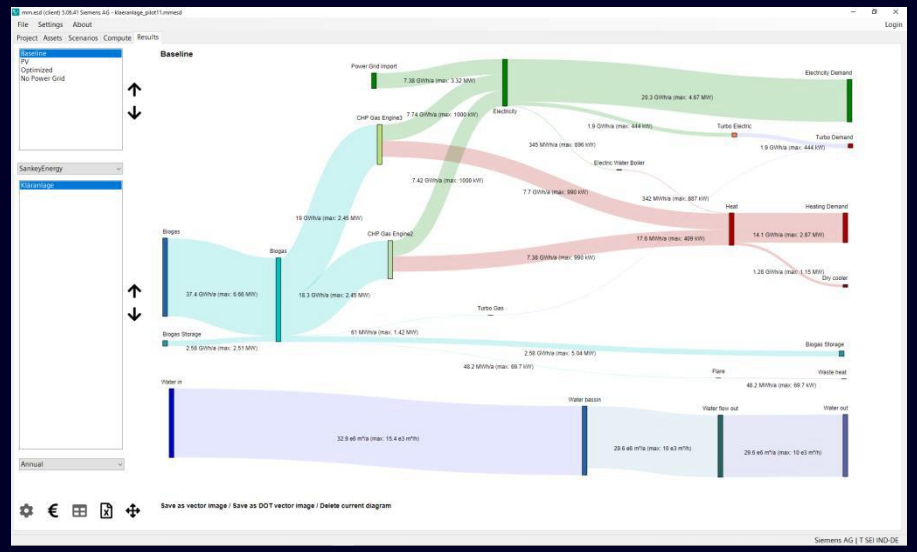
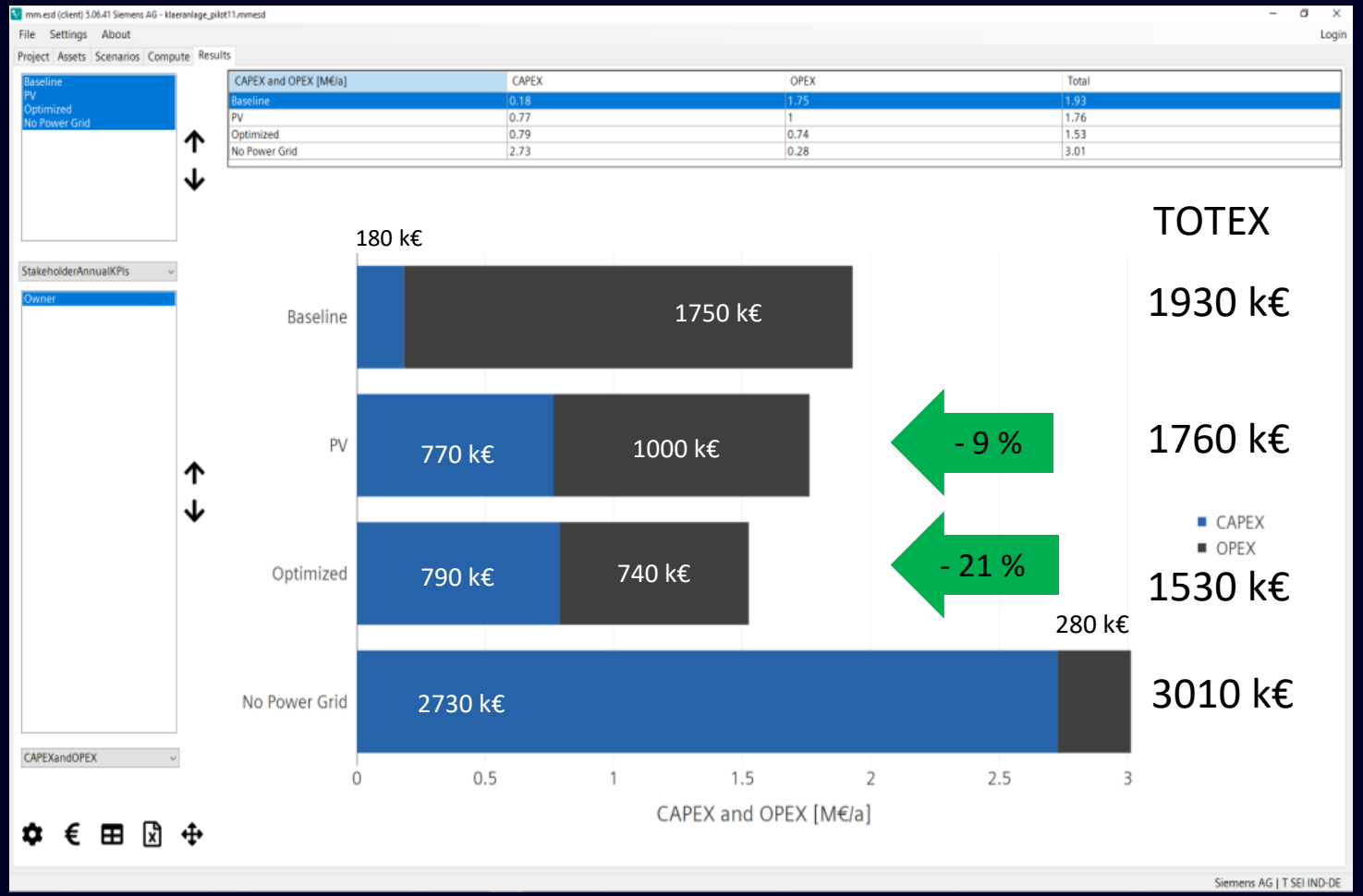
Example Demo Sewage treatment plant - 700‘000 Population equivalents





mm.esd by SIEMENS



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